



CASE STUDY: CAB Abstracts on CAB Direct Panama disease of bananas

CAB Abstracts is the most complete applied life sciences literature database in the world. Its coverage includes agriculture, environment, veterinary sciences, applied economics, food science and nutrition.

CABI's online database platform, **CAB Direct**, has been built specifically for researchers working in the applied life sciences to help them use CAB Abstracts to research complex problems quickly and with precision.

Panama disease of bananas

In the 1950s, Panama disease virtually destroyed the banana crop worldwide. Plantations were replanted with Cavendish bananas which were resistant to the disease. A new strain of Panama disease, Tropical Race 4 or TR4, has emerged which Cavendish bananas are susceptible to. TR4 is destroying banana plantations in Southeast Asia and has spread to Northern Australia, the Middle East and Africa.

No single method of controlling TR4 has been identified and the global supply of bananas is once again under threat.

CAB Abstracts is the most comprehensive database of applied life sciences literature in the world. CAB Direct is the only online platform built specifically to help researchers maximise the potential of CAB Abstracts.

On **CAB Direct**, CAB Abstracts can help researchers understand the scale of the problem and identify potential methods or combinations of methods for managing Panama disease, particularly strain TR4.

The screenshots in this case study show CAB Abstracts in use on the CAB Direct platform.



Panama disease of bananas, leaf symptoms



Panama disease of bananas, internal stem close-up



CAB Abstracts contains over 8.2 million records providing access to the world's applied life sciences literature.

Search: [Keyword](#) [Advanced](#) [Browse all content](#) [Thesaurus](#) [?](#)

clear search

Enter keyword search [Search](#)

[Search](#) [Selected records](#) [Search history](#) [My CABi](#) [My Projects](#)

Refined by: Your Products: CAB ABSTRACTS [×](#) [Clear all](#) [×](#) [Edit Search](#) [?](#) [+](#) [Save search](#) [📄](#)

Search Results: 8,272,835 results (approx.)

Actions [📄](#) [📄](#) [+](#) [📄](#)

All Sort by: [Relevance](#) Show: [25](#) Page: [1](#) of 330914 [◀](#) [▶](#)

1. Special Feature: Demography beyond the population.
Publisher: Wiley-Blackwell, Oxford, UK
Journal issue: [Functional Ecology](#) 2016 Vol.30 No.2 pp.157-180

2. Structure revision of (22E)-ergosta-7,22-diene-3β,5α,6β,9α,14α-pentol from the spores of the medicinal mushroom *Ganoderma lucidum*.
Careful reexamination of the published ¹H and ¹³C NMR spectral data of (22E)-ergosta-7,22-diene-3β,5α,6β,9α,14α-pentol (1), isolated from the spores of the medicinal mushroom *Ganoderma lucidum*, indicates that, in reality, the compound is (22E)-ergosta-7,22-diene-3β,5α,6β,9α,14β-pentol (5).
Author(s): [Yaoita, Y.](#); [Machida, K.](#)
Publisher: Natural Product, Inc, Westerville, USA
Journal article: [Natural Product Communications](#) 2016 Vol.11 No.2 pp.183-184

3. 'More-than-human' resilience(s)? Enhancing community in Finnish forest farms.
Author(s): [Herman, A.](#)
Publisher: Elsevier Ltd, Oxford, UK
Journal article: [Geoforum](#) 2016 Vol.69 pp.34-43 ref.many

4. Studies on swelling of wood with water and ionic liquids.
A recently developed simple method to qualitatively study the swelling behavior of polymeric gels is applied to swelling studies of wood with water and ionic liquids. Results are presented showing the differences between and the peculiarities of both kinds of swelling agents. In proof-of-principle...
Author(s): [Höhne, P.](#); [Tauer, K.](#)
Publisher: Springer Berlin, Heidelberg, Germany
Journal article: [Wood Science and Technology](#) 2016 Vol.50 No.2 pp.245-258 ref.36

5. Plant organogenesis: rules of order.
Plant lateral roots have a defined developmental pattern and shape, but a key question is whether strict regulation underlies observed regularity. A new study uses long-term *in toto* live imaging and simulations to show that organogenesis rather follows self-organizing principles.
Author(s): [Zeeuw, T. de.](#); [Weijers, D.](#)
Publisher: Cell Press, Cambridge, USA
Journal article: [Current Biology](#) 2016 Vol.26 No.4 pp.R157-R159

Results by Year:
Use the slider to define a range of years.
From 1880 To 2016 [≡](#)

Update results

Refine by: [?](#)

[Topics](#)

[Organism Descriptors](#)

[Broader terms](#)

[Document type](#)

[Year](#)

[Source title](#)

[Author](#)

[Geographic Location](#)

[Language](#)

[Your Products](#)

[CABI Hosted Full Text](#)



Searching CAB Abstracts for the phrase “Panama disease” gives us some results, and the information you require to develop the search.

On CAB Direct, the results page has been designed to make searching for relevance fast and simple.

Search: [Keyword](#) [Advanced](#) [Browse all content](#) [Thesaurus](#)
?

[clear search](#)

Search
Selected records
Search history
My CABI
My Projects

Refined by: Your Products: CAB ABSTRACTS ✕ [Clear all](#) ✕ [Edit Search](#) ? [+](#) Save search

Search Results: 189 results (approx.)

Actions

All
Sort by: Relevance
Show: 25
Page: 1 of 8

1. Genetic diversity, growth and production of genotypes of banana 'Prata-Anã' in area with Panama disease.

In the irrigated area of Jaíba in Northern Minas Gerais, there are reports on the presence of some genotypes of banana cv. Prata-Anã supposedly tolerant to the **Panama disease**, where the disease was not established after 15 years of cultivation even in the presence of the pathogen. Therefore this...

Foreign Title :Diversidade genética, crescimento e produção de genótipos de bananeira 'Prata-Anã' em área com mal do Panamá.

Author(s) : [Lopes, O. P.](#); [Maia, V. M.](#); [Xavier, A. A.](#); [Costa, M. R. da](#); [Rodrigues, M. G. V.](#)

Publisher : Sociedade Brasileira de Fruticultura, Jaboticabal, Brazil

Journal article : [Revista Brasileira de Fruticultura](#) 2014 Vol.36 No.4 pp.924-939 ref.29

2. Tropical race 4 of Panama disease in the Middle East.

Panama disease (aka Fusarium wilt) of banana (*Musa* spp.) has been a destructive problem for well over a century. Race 1 of the pathogen, *Fusarium oxysporum* f. sp. *cubense* (Foc), was responsible for the demise of the first export trades of banana that were based on the cultivar 'Gros Michel'...

Author(s) : [Ploetz, R.](#); [Freeman, S.](#); [Konkol, J.](#); [Al-Abed, A.](#); [Naser, Z.](#); [Shalan, K.](#); [Barakat, R.](#); [Israeli, Y.](#)

Publisher : Springer, Dordrecht, Netherlands

Journal article : [Phytoparasitica](#) 2015 Vol.43 No.3 pp.283-293 ref.51

3. Control of Panama disease of banana by rotating and intercropping with Chinese chive (*Allium tuberosum* Rottler): role of plant volatiles.

Intercropping and rotating banana (*Musa* spp.) with Chinese chive (*Allium tuberosum* Rottler) has been used as an effective method to control **Panama disease** (Fusarium wilt) of banana in South China. However, the underlying mechanism is unknown. In this study, we used aqueous leachates and volatiles...

Author(s) : [Zhang Hui](#); [Mallik, A.](#); [Zeng RenSen](#)

Publisher : Springer, New York, USA

Journal article : [Journal of Chemical Ecology](#) 2013 Vol.39 No.2 pp.243-252 ref.45

4. Yield, nutrition and incidence of Panama disease in 'Prata Anã' banana fertilized with potassium.

The objective of this work was to estimate the K dose necessary to obtain the maximum physical efficiency of production and the critical foliar level of the nutrient, as well as to verify the relationship of soil application of K with the nutritional balance and the incidence of **Panama disease** (**Foreign Title** :Produção, nutrição e incidência do mal do Panamá em bananeira 'Prata

Results by Year:

Use the slider to define a range of years.

From 1970 To 2016 ≡

Update results Update results

Refine by : ?

- [Topics](#)
- [Organism Descriptors](#)
- [Broader terms](#)
- [Document type](#)
- [Year](#)
- [Source title](#)
- [Author](#)
- [Geographic Location](#)
- [Language](#)
- [Your Products](#)
- [CABI Hosted Full Text](#)

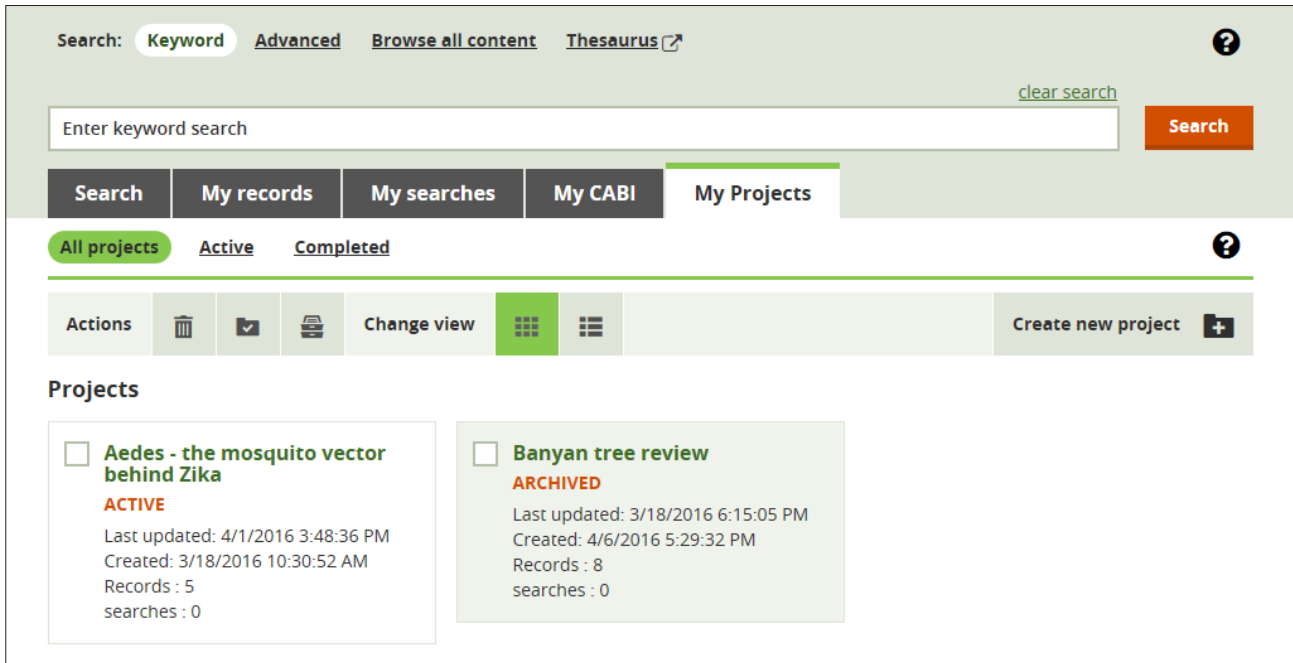
➔ To make searching really powerful, CAB Abstracts is indexed using the CAB Thesaurus, the largest and most comprehensive controlled vocabulary in the applied life sciences.

CAB Direct uses a new visual interface so we can quickly see which terms are most commonly used, and easily identify and refine by the correct organism descriptions for Panama disease.

The screenshot displays the search refinement interface in CAB Direct. At the top, it says "Select one or more to refine your search:" with a "Close" button. Below this, the current search criteria are shown: "Organism Descriptors: Fusarium oxysporum f.sp. cubense" and "OR Fusarium oxysporum". There are "Refine results" and "Clear all" buttons. The interface allows for logical operations: "OR" (selected), "AND", and "NOT". A note states: "Please note, by default selecting one item will result in an 'AND', unless you select 'NOT'". A "Show list" link is present. The central treemap visualization shows a hierarchy of terms. The largest blocks are "Musa" (blue) and "fungi" (light blue). Under "fungi", there are sub-blocks for "Fusarium", "Musa paradisiaca", "Mycosphaerellaceae", "Musa acuminata", "Radopholus similis", and "Nematoda Ralstonia solanacearum". The "Fusarium oxysporum f.sp. cubense" and "Fusarium oxysporum" terms are highlighted in dark green. A second "Show list" link is below the treemap. At the bottom, the search criteria are repeated: "Organism Descriptors: Fusarium oxysporum f.sp. cubense" and "OR Fusarium oxysporum", with "Refine results" and "Clear all" buttons. On the right side, a vertical sidebar lists various filters: "Organism Descriptors", "Broader terms", "Document type", "Year", "Source title", "Author", "Geographic Location", "Language", "Your Products", "CABI Hosted Full Text", "Evidence Based Research", "Open Access Journals", "Find results from other sites:", "Search on FAO", "Search on PubMed", "Search on USDA", "Search on europeana", and "Search on DPLA".

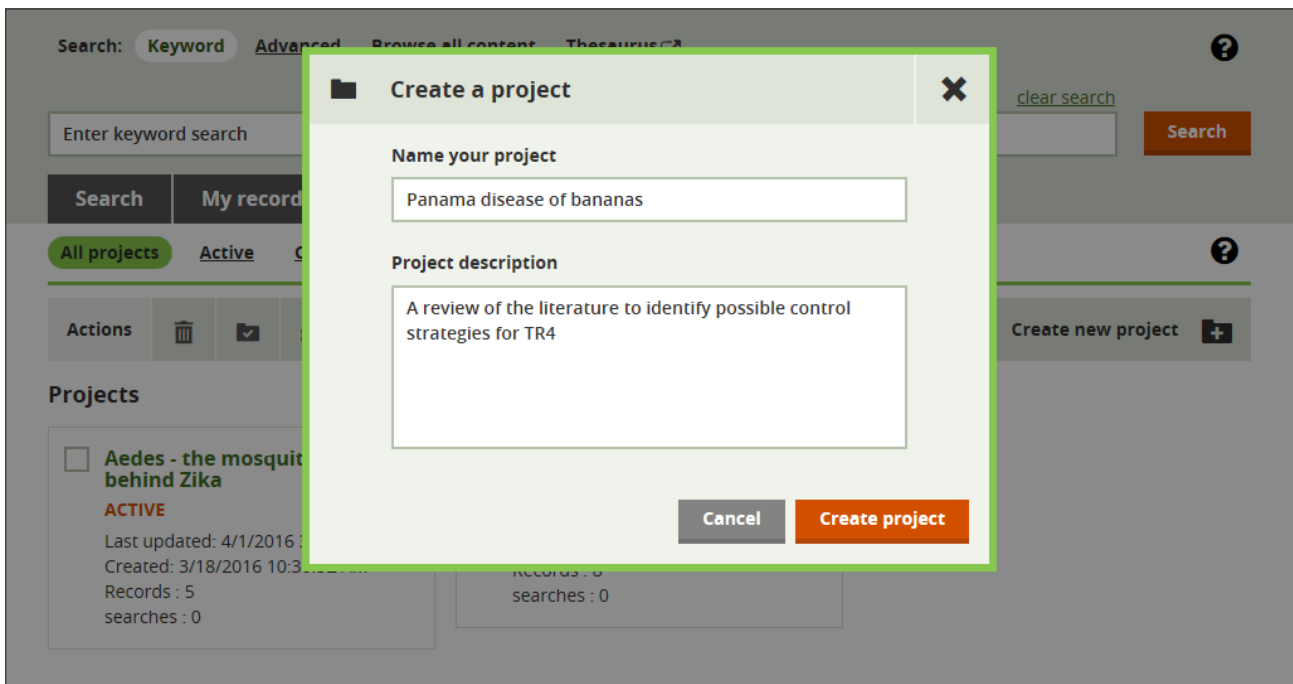
Now that we have a search strategy developing and a set of results to work with, we can use the *My Projects* feature on CAB Direct to save and organise our searches and results.

It's quick and simple to sign-up for a *My CABI* account and with this we can save searches and records, create and work on projects, highlight records and add annotations as well.




The screenshot shows the 'My Projects' section of the CAB Direct interface. At the top, there is a search bar with 'Keyword' selected and a 'Search' button. Below the search bar are navigation tabs: 'Search', 'My records', 'My searches', 'My CABI', and 'My Projects'. Under 'My Projects', there are sub-tabs for 'All projects', 'Active', and 'Completed'. A toolbar contains icons for actions like delete, checkmark, and print, along with a 'Change view' button and a 'Create new project' button. The main area displays two project cards:

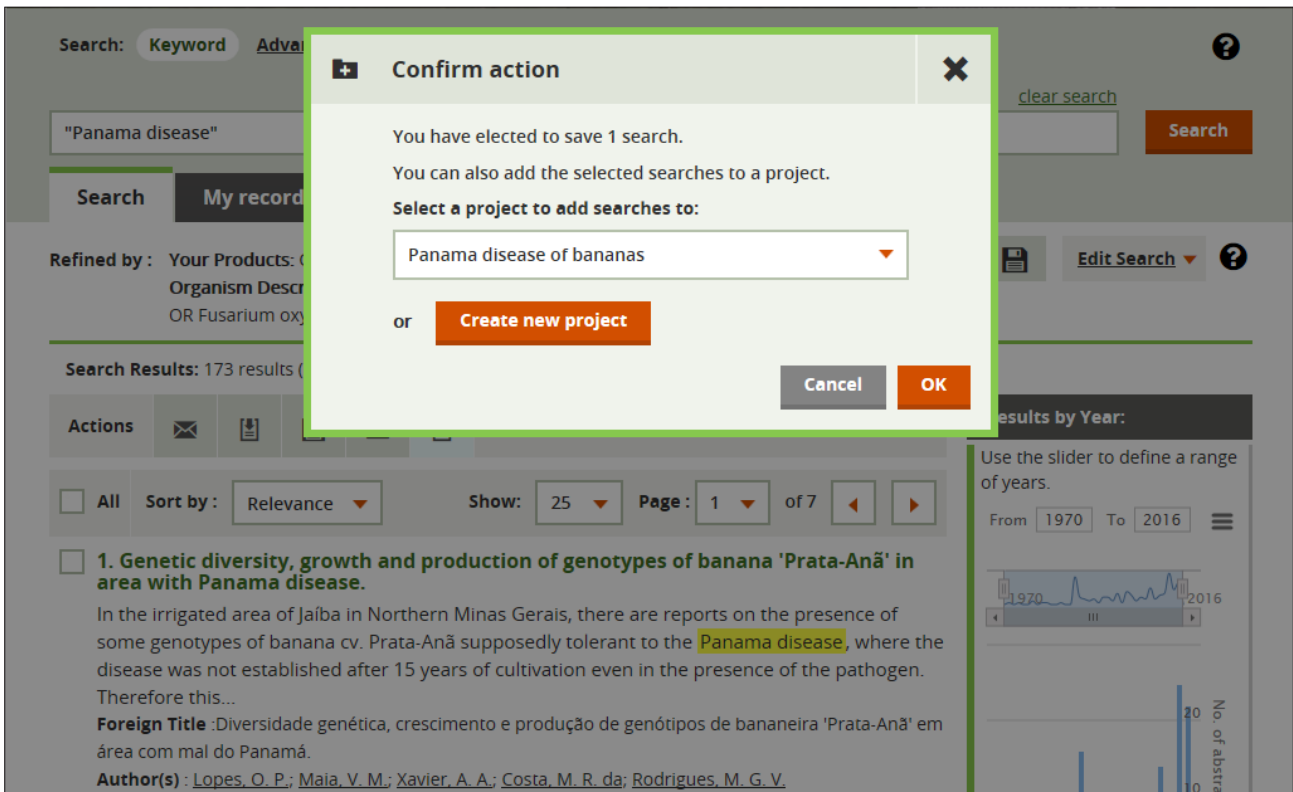
- Aedes - the mosquito vector behind Zika**
ACTIVE
Last updated: 4/1/2016 3:48:36 PM
Created: 3/18/2016 10:30:52 AM
Records : 5
searches : 0
- Banyan tree review**
ARCHIVED
Last updated: 3/18/2016 6:15:05 PM
Created: 4/6/2016 5:29:32 PM
Records : 8
searches : 0



The screenshot shows the 'Create a project' dialog box overlaid on the 'My Projects' page. The dialog box has a title bar with a folder icon and a close button. It contains the following fields and buttons:

- Name your project**: A text input field containing 'Panama disease of bananas'.
- Project description**: A text area containing 'A review of the literature to identify possible control strategies for TR4'.
- Buttons**: 'Cancel' and 'Create project'.

 We can now go back to the search results, develop the search strategy and save searches to the project.



The screenshot shows a search interface with a modal dialog box titled "Confirm action". The dialog box contains the following text:

Confirm action

You have elected to save 1 search.
You can also add the selected searches to a project.
Select a project to add searches to:

Panama disease of bananas

or **Create new project**

Cancel **OK**

The background interface shows a search for "Panama disease" with 173 results. The first result is titled "1. Genetic diversity, growth and production of genotypes of banana 'Prata-Anã' in area with Panama disease." and includes a summary, foreign title, and author information.



The edit search function is an easy way to remove the informal search phrase “Panama disease”, so that we use only the correct organism names.

This gives us many more results to work with.

Search: **Keyword** [Advanced](#) [Browse all content](#) [Thesaurus](#) ?

clear search

"Panama disease" **Search**

Search My records My searches My CABI My Projects

Refined by: Your Products: CAB ABSTRACTS ✕
 Organism Descriptors: Fusarium oxysporum f.sp. cubense ✕
 OR Fusarium oxysporum ✕ **Clear all** ✕

Save search **Edit Search** ?

```

  ("Panama disease") AND ( ((sc:( ( "CA" ) )) (organism-descriptor:( ( "Fusarium%20oxysporum%20f.sp.%20cubense"
  OR "Fusarium%20oxysporum" ) ) ) ) )
  
```

Cancel **Re-submit query**

Search Results: 173 results (approx.)

Search: **Keyword** [Advanced](#) [Browse all content](#) [Thesaurus](#) ?

clear search

((sc:(("CA"))) (organism-descriptor:(("Fusarium oxysporum f.sp. cubense" OR "Fusarium oxysporum"))))

Search My records My searches My CABI My Projects

Save search **Edit Search** ?

Search Results: 12,694 results (approx.)

Actions

All **Sort by:** Relevance ▼ **Show:** 25 ▼ **Page:** 1 ▼ of 508

1. Evaluation of bioactive compounds of *Ophiocordyceps sinensis* [Berk.] Sacc. against *Fusarium* spp.
 Studies were undertaken to extract and evaluate the bioactive compounds of Chinese caterpillar fungus, *Ophiocordyceps sinensis* against the wilt pathogen, *Fusarium* spp. Ethyl acetate fraction of the culture filtrate condensate (CFC) at 1500 ppm concentration showed the maximum mycelial inhibition of ...
Author(s) : Sangeetha, C.; Krishnamoorthy, A. S.; Nakkeeran, S.; Ramakrishnan, S.; Amirtham, D.
Publisher : Dr P. R. Yadav, Muzaffrnagar, India
Journal article : [Biochemical and Cellular Archives](#) 2015 Vol.15 No.2 pp.431-435 ref.19

Results by Year:
 Use the slider to define a range of years.
 From 1964 To 2016

➔ We can use the interactive date chart to restrict the results to recently published articles, in this case articles published in 2015.

The screenshot shows a search interface with a date chart and a list of years to refine the search. The date chart shows the number of abstracts from 1964 to 2016, with a callout for 2004-2005 showing a volume of 728. The list of years includes 2016 (50), 2015 (510), 2014 (571), 2013 (618), 2012 (648), 2011 (723), 2010 (534), 2009 (499), 2008 (450), 2007 (438), 2006 (400), 2005 (375), 2004 (353), and 2003 (328). A 'Select years' button is visible at the bottom of the chart area.

Use the slider to define the range of years to view.

From 1964 To 2016

2004 - 2005
Abstracts Volume = 728

No. of abstracts

Publication Year

Select 'select years' to refine your search by that range.

Select years

Select one or more to refine your search: Close X

OR AND NOT

Please note, by default selecting one item will result in an "AND", unless you select "NOT".

2016 (50) 2015 (510)

2014 (571) 2013 (618)

2012 (648) 2011 (723)

2010 (534) 2009 (499)

2008 (450) 2007 (438)

2006 (400) 2005 (375)

2004 (353) 2003 (328)

2002 (356)

Show more +

Year

Source title

Author

Geographic Location

Language

Your Products

CABI Hosted Full Text

Evidence Based Research

Open Access Journals

Find results from other sites:

Search on FAO

Search on PubMed

Search on USDA

Search on europeana

Search on DPLA

➔ And we can select interesting records and save them to the project too.

The screenshot shows a search interface with a search result and an 'Add to project' dialog box. The search result is for '1. Evaluation of bioactive compounds of Ophiocordyceps sinensis [Berk.] Sacc. against Fusarium spp.' and includes author and publisher information. The 'Add to project' dialog box is open, showing a dropdown menu with 'Panama disease of bananas' selected and a 'Create new project' button. The dialog box also has 'Cancel' and 'Add to project' buttons.

((((sc:(("CA")) (organism-descriptor:(("Fusarium oxysporum f.sp. cubense" OR "Fusarium oxysporum")))))))

Search

Search My record

Refined by: Year: 2015 X

Search Results: 510 results (

Actions

All Sort by: Releva

1. Evaluation of bioactive compounds of *Ophiocordyceps sinensis* [Berk.] Sacc. against *Fusarium* spp.

Studies were undertaken to extract and evaluate the bioactive compounds of Chinese caterpillar fungus, *Ophiocordyceps sinensis* against the wilt pathogen, *Fusarium* spp. Ethyl acetate fraction of the culture filtrate condensate (CFC) at 1500 ppm concentration showed the maximum mycelial inhibition of ...

Author(s) : Sangeetha, C.; Krishnamoorthy, A. S.; Nakkeeran, S.; Ramakrishnan, S.; Amirtham, D.

Publisher : Dr P. R. Yadav, Muzaffarnagar, India

Journal article : Biochemical and Cellular Archives 2015 Vol.15 No.2 pp.431-435 ref.19

2. Effects of bio-organic fertilizers produced by four *Bacillus amyloliquefaciens* strains on banana fusarium wilt disease.

Continuous planting of banana disrupts the micro-ecological balance, resulting in severe

results by Year:

Use the slider to define a range years.

from 2014 To 2015

No. of abstracts

400

200

0

Add to project

Select a project to add record(s) to:

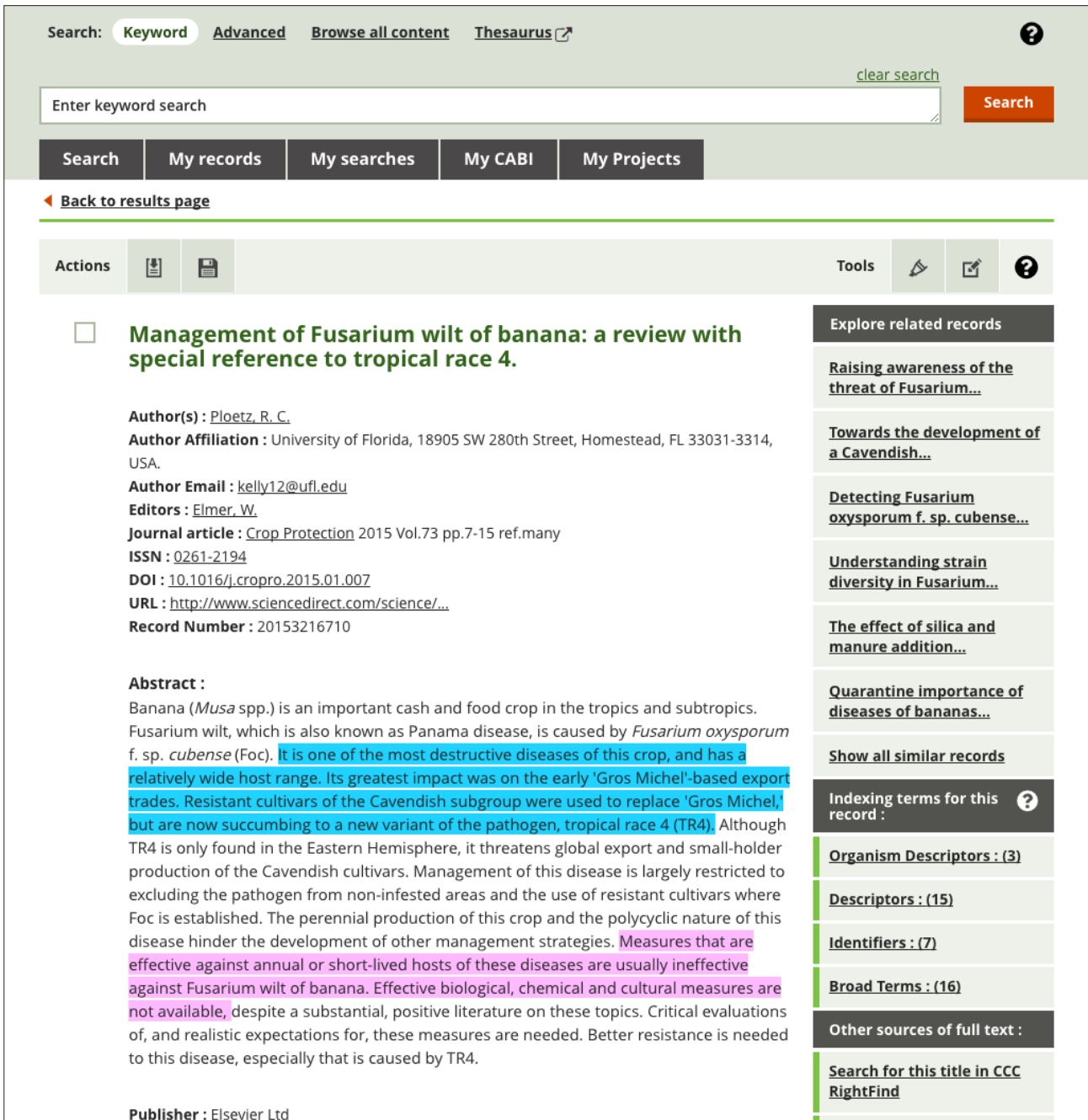
Panama disease of bananas

or Create new project


Cancel Add to project

 In CAB Abstracts on CAB Direct, we can highlight significant passages of text.

Here we see that CAB Abstracts covers research that examines the scale of the problem, its potential economic impact and methods for detecting it.



The screenshot displays the CAB Abstracts search results page. At the top, there is a search bar with the text 'Enter keyword search' and a 'Search' button. Below the search bar, there are navigation tabs for 'Search', 'My records', 'My searches', 'My CABI', and 'My Projects'. The main content area shows a search result for the article 'Management of Fusarium wilt of banana: a review with special reference to tropical race 4.' by Ploetz, R. C. The abstract text is visible, with several sentences highlighted in blue and pink. On the right side, there is a sidebar with various options like 'Explore related records', 'Raising awareness of the threat of Fusarium...', 'Towards the development of a Cavendish...', 'Detecting Fusarium oxysporum f. sp. cubense...', 'Understanding strain diversity in Fusarium...', 'The effect of silica and manure addition...', 'Quarantine importance of diseases of bananas...', 'Show all similar records', 'Indexing terms for this record', 'Organism Descriptors : (3)', 'Descriptors : (15)', 'Identifiers : (7)', 'Broad Terms : (16)', and 'Other sources of full text : Search for this title in CCC RightFind'.



Search: [Keyword](#) [Advanced](#) [Browse all content](#) [Thesaurus](#) 




clear search

Enter keyword search [Search](#)

[Search](#) [My records](#) [My searches](#) [My CABI](#) [My Projects](#)

[Back to results page](#)

Actions  

Tools   

Management of Fusarium wilt of banana: a review with special reference to tropical race 4.

Author(s) : [Ploetz, R. C.](#)
Author Affiliation : University of Florida, 18905 SW 280th Street, Homestead, FL 33031-3314, USA.
Author Email : kelly12@ufl.edu
Editors : [Elmer, W.](#)
Journal article : [Crop Protection](#) 2015 Vol.73 pp.7-15 ref.many
ISSN : [0261-2194](#)
DOI : [10.1016/j.cropro.2015.01.007](#)
URL : <http://www.sciencedirect.com/science/...>
Record Number : 20153216710

Abstract :
Banana (*Musa* spp.) is an important cash and food crop in the tropics and subtropics. Fusarium wilt, which is also known as Panama disease, is caused by *Fusarium oxysporum* f. sp. *cubense* (Foc). It is one of the most destructive diseases of this crop, and has a relatively wide host range. Its greatest impact was on the early 'Gros Michel'-based export trades. Resistant cultivars of the Cavendish subgroup were used to replace 'Gros Michel', but are now succumbing to a new variant of the pathogen, tropical race 4 (TR4). Although TR4 is only found in the Eastern Hemisphere, it threatens global export and small-holder production of the Cavendish cultivars. Management of this disease is largely restricted to excluding the pathogen from non-infested areas and the use of resistant cultivars where Foc is established. The perennial production of this crop and the polycyclic nature of this disease hinder the development of other management strategies. Measures that are effective against annual or short-lived hosts of these diseases are usually ineffective against Fusarium wilt of banana. Effective biological, chemical and cultural measures are not available, despite a substantial, positive literature on these topics. Critical evaluations of, and realistic expectations for, these measures are needed. Better resistance is needed to this disease, especially that is caused by TR4.

Publisher : [Elsevier Ltd](#)

Explore related records

[Raising awareness of the threat of Fusarium...](#)

[Towards the development of a Cavendish...](#)


[Detecting Fusarium oxysporum f. sp. cubense...](#)

[Understanding strain diversity in Fusarium...](#)

[The effect of silica and manure addition...](#)

[Quarantine importance of diseases of bananas...](#)

[Show all similar records](#)

Indexing terms for this record : 

Organism Descriptors : (3)

Descriptors : (15)






Identifiers : (7)

Broad Terms : (16)

Other sources of full text :

[Search for this title in CCC RightFind](#)

 In CAB Direct we can organise our data by using different colours to highlight different parts of the abstract, for example the research objective and the results.


Actions  Choose a colour    

Potential economic impact of Panama disease (tropical race 4) on the Australian banana industry.

Author(s) : [Cook, D. C.](#); [Taylor, A. S.](#); [Meldrum, R. A.](#); [Drenth, A.](#)
 Author Affiliation : Department of Agriculture and Food Western Australia, Bunbury WA 6231, Australia.

Explore related records





- [Karnal bunt - the regional economic effects...](#)
- [The impact of in-feed mycotoxins and the...](#)

Search: **Keyword** [Advanced](#) [Browse all content](#) [Thesaurus](#) 

Enter keyword search clear search Search

Search | My records | My searches | My CABI | My Projects

[Back to results page](#)

Actions   Tools   

Potential economic impact of Panama disease (tropical race 4) on the Australian banana industry.


Author(s) : [Cook, D. C.](#); [Taylor, A. S.](#); [Meldrum, R. A.](#); [Drenth, A.](#)
 Author Affiliation : Department of Agriculture and Food Western Australia, Bunbury WA 6231, Australia.
 Author Email : david.cook@agric.wa.gov.au
 Journal article : [Journal of Plant Diseases and Protection](#) 2015 Vol.122 No.5/6 pp.229-237 ref.36
 ISSN : 1861-3829
 URL : <http://www.jpdp-online.com>
 Record Number : 20163017915

Abstract :
 Panama disease, caused by *Fusarium oxysporum* f.sp. *cubense* tropical race 4, is considered to be one of the most severe threats facing the banana industry worldwide. Tropical race 4 has rapidly spread throughout Southeast Asia since first being reported from Taiwan in 1990 and Indonesia in 1992. It was first discovered in Australia in 1997 where strict quarantine management contained its distribution to the Northern Territory for almost two decades until March 2015 when it was detected in Tully, North Queensland. **The spread of this disease to the major banana production areas in Queensland could have a severe impact on the Australian banana industry as no effective chemical control options exist and no resistance has as yet been identified in agronomically acceptable banana varieties.** However, given its successful containment in the Northern Territory there is uncertainty about future losses, and consequently what resources should be expended on its continued control. In this paper, we construct a dynamic model to estimate potential financial consequences for the Australia banana industry over time if the disease spreads beyond its current distribution. Scenarios modelled account for the possibility of spread via natural means described by a diffusion-like process, and also by large jumps mediated by human activities. **Aggregating results of likely spread over time, we predict the disease will cause industry losses exceeding \$138 million per year despite a slow rate of spread.**

Publisher : Eugen Ulmer KG

Explore related records

- [Water, irrigation and plant diseases.](#)
- [Identification and application of a unique...](#)
- [Are banana weevil borers a vector in...](#)
- [Recent occurrence of Fusarium oxysporum f....](#)
- [Epidemiology and management of Panama...](#)
- [Fusarium oxysporum f. sp. cubense....](#)
- [Show all similar records](#)
- Indexing terms for this record :
 - Organism Descriptors : (3)**
 - Descriptors : (11)**
 - Identifiers : (6)**
 - Broad Terms : (23)**
 - GeographicLocation : (3)**
- Other sources of full text :
 - [Search for this title in CCC](#)

 The abstract below describes a sensitive, specific and rapid detection method (real time PCR) for determining infection – the first step for preventing disease spread and implementing control measures.

With CAB Direct we can create our own notes, by annotating records, to add context and meaning.

Search: **Keyword** [Advanced](#) [Browse all content](#) [Thesaurus](#) 

Enter keyword search [clear search](#) **Search**

Search **My records** **My searches** **My CABI** **My Projects**

[◀ Back to results page](#)

Actions   **Tools**   

Development of a single-tube duplex real-time fluorescence method for the rapid quantitative detection of *Fusarium oxysporum* f. sp. *cubense* race 1 (FOC1) and race 4 (FOC4) using TaqMan probes.

Author(s) : [Yang LeiLiang](#); [Sun LiXia](#); [Ruan XiaoLei](#); [Qiu DeYi](#); [Chen DingHu](#); [Cai XianQuan](#); [Li HuaPing](#)

Author Affiliation : State Key Laboratory of Conservation and Utilization of Subtropical Agro-bioresources, South China Agricultural University, Guangzhou, Guangdong 510642, China.

Author Email : huaping@scau.edu.cn

Journal article : [Crop Protection](#) 2015 Vol.68 pp.27-35 ref.38

ISSN : 0261-2194

DOI : [10.1016/j.cropro.2014.11.004](https://doi.org/10.1016/j.cropro.2014.11.004)

URL : [http://www.sciencedirect.com/science/...](http://www.sciencedirect.com/science/)

Record Number : 20153051809

Abstract :

Banana fusarium wilt caused by *Fusarium oxysporum* f. sp. *cubense* race 1 (FOC1) and race 4 (FOC4) is a destructive disease that affects bananas in tropical and subtropical areas worldwide. A sensitive and specific detection method is the primary step to preventing spread of the disease. In this study, a real-time fluorescence PCR method was developed based on specific conserved primers from the markers of sequence characterized amplified region (SCAR) and TaqMan probes for detecting FOC1 and FOC4. The results showed that **real-time fluorescence PCR could be used to detect FOC1 and FOC4 accurately and effectively within 90 min (not including DNA extraction). The developed method had high specificity and could therefore be used to distinguish *F. oxysporum* f. sp. *cubense* from other allied species and forma, such as *Fusarium verticillioides*, *Fusarium oxysporum* f. sp. *melonis*, *Fusarium oxysporum* f. sp. *momodicae*, *Fusarium oxysporum* f. sp. *benincasae*, and *Fusarium oxysporum* f. sp. *opuntiarum*, and other plant pathogens, such as *Penicillium*.** This detection system also demonstrated high sensitivity, yielding a total copy number of 91,258, which was 100 times higher than that of endpoint PCR. We found that FOC1 had approximately 36 times higher abundance in banana 'Guangfen #1' pseudostem than FOC4 at 14 days after infection. In addition, banana 'Guangfen #1' root tissues showed an approximately 23 times higher abundance of FOC1 than corm tissues in field samples. **In conclusion, the developed single-tube duplex real-time PCR method can sensitively distinguish FOC1 and FOC4 with high specificity.** This method can be utilized to assist in the implementation of quarantine measures for the prevention and control of banana fusarium wilt caused by *F. oxysporum* f. sp. *cubense*.

Publisher : [Elsevier Ltd](#)

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1

Real time PCR - detection method
This is a sensitive, specific and rapid detection method for determining infection, the first step in preventing disease and implementing control 

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Indexing terms for this record 

Organism Descriptors : (6)

Descriptors : (8)

Identifiers : (7)

Broad Terms : (21)

Other sources of full text :

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<input type="checkbox"/> phytopathogenic fungi (395)	<input type="checkbox"/> plant pathogenic fungi (395)	<input type="checkbox"/> plant diseases (185)
<input type="checkbox"/> fungal diseases (178)	<input type="checkbox"/> bacterium (150)	<input type="checkbox"/> antifungal properties (113)
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<input checked="" type="checkbox"/> biological control agents (100)	<input checked="" type="checkbox"/> biological control organisms (100)	<input type="checkbox"/> genes (100)
<input type="checkbox"/> pathogens (71)	<input checked="" type="checkbox"/> biocontrol (64)	<input checked="" type="checkbox"/> biological control (64)
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<input checked="" type="checkbox"/> plant disease control	<input type="checkbox"/> disease resistance (55)	<input type="checkbox"/> resistance to disease

Topics

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The results show that an endophyte is one of the methods of control in the research literature.

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Refined by: Topics: control ✕ OR plant disease control ✕
 OR biocontrol agents ✕ OR biological control agents ✕
 OR biological control organisms ✕ OR biological control ✕
 OR biocontrol ✕ OR fungal antagonists ✕
 OR antifungal properties ✕ [Clear all](#) ✕

Search Results: 346 results (approx.)
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Actions

All
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Show: 25
Page: 1 of 14

1. Biological control of Panama disease (*Fusarium oxysporum* f. sp. *cubense*) using endophytic fungi.

The objective of this study was to evaluate the effect of three isolates of endophytic fungi of *Trichoderma atroviride*, Endo 1, Endo 2 and Endo 3, for the biocontrol of the Panama disease in banana cultivar Gros Michel (AAA), caused by *Fusarium oxysporum* f. sp. *cubense* (Foc). Six week old...

Foreign Title :Control biológico del mal de panamá (

Author(s) : Ortiz, R.; Pocasangre, L. E.

Publisher : Universidad EARTH, Guácimo, Costa Rica

Journal article : *Tierra Tropical: Sostenibilidad, Ambiente y Sociedad* 2012 Vol.8 No.2 pp.221-228 ref.19

2. Use of endophytic insulation of *Trichoderma* spp., for biocontrol of Panama disease (*Fusarium oxysporum* f. sp. *cubense*) race 1, in vitro plants of banana, Gros Michel variety (AAA) under greenhouse.

The objective of this research was to select isolates of endophytic fungi of *Trichoderma* spp., for the biocontrol of *Fusarium oxysporum* f. sp. *cubense* race 1. We evaluated the three most pathogenic isolates FOC2, FOC4, FOC8 cryobank obtained from the Laboratory of Plant Pathology and Nematology at...

Foreign Title :Uso de aislamientos endofíticos de

Author(s) : Caballero Hernández, Á. J.; Pocasangre Enamorado, L. E.; Casanoves, F.; Avelino, J.; Tapia Fernández, A. C.; Ortiz, J. L.

Publisher : Universidad Nacional Agraria, Managua, Nicaragua

Journal article : *La Calera* 2013 Vol.13 No.20 pp.16-23 ref.19

3. Evaluation of nonpathogenic *Fusarium oxysporum* and *Pseudomonas fluorescens* for Panama disease control.

Nonpathogenic *Fusarium oxysporum* endophytes from healthy banana roots were evaluated for their ability to reduce Fusarium wilt of banana (Panama disease). Isolates were identified morphologically and by using species-specific primers. Pathogenicity was confirmed by inoculating banana plantlets in...

Author(s) : Belgrove, A.; Steinberg, C.; Viljoen, A.

Publisher : American Phytopathological Society (APS Press), St. Paul, USA

Journal article : *Plant Disease* 2011 Vol.95 No.8 pp.951-959 ref.60

Results by Year:

Use the slider to define a range of years.

From 1915 To 2016

Update results

Refine by: ?

- Topics
- Organism Descriptors
- Broader terms
- Document type
- Year
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Results include an article suggesting that the endophytes have shown positive results.

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***In planta* biocontrol of soilborne *Fusarium* wilt of banana through a plant endophytic bacterium, *Burkholderia cenocepacia* 869T2.**

Author(s) : [Ho YingNing](#); [Chiang HsingMei](#); [Chao ChihPing](#); [Su ChingChung](#); [Hsu HuiFang](#); [Guo ChenTong](#); [Hsieh JuLiang](#); [Huang ChiehChen](#)

Author Affiliation : Department of Life Sciences, College of Life Sciences, National Chung Hsing University, 250, Kuo Kuang Rd., Taichung, 402, Taiwan.

Author Email : silentboyryan0109@gmail.com , katie04154@gmail.com , cpchao_tbri@yahoo.com.tw , succcc@yahoo.com.tw , on1305@yahoo.com.tw , chentong79621@gmail.com , bio1gene@yahoo.com.tw , cchuang@dragon.nchu.edu.tw

Journal article : [Plant and Soil](#) 2015 Vol.387 No.1/2 pp.295-306 ref.42

ISSN : [0032-079X](#)

URL : <http://rd.springer.com/journal/11104>

Record Number : 20153068874

Abstract :

Aim: *Fusarium* wilt (Panama disease) caused by *Fusarium oxysporum* f. sp. *cubense* tropical race 4 (Foc TR4) is a soilborne disease that severely devastates the banana industry worldwide. We aimed to isolate beneficial endophytic bacterial strains against Panama disease. Methods: From different plant species, including reeds (*Phragmites australis*), vetiver grass (*Chrysopogon zizanioides*), and banana plants (Cavendish cv. Pei-Chiao, Cavendish cv. Formosana, and *Musa sapientum* cv. Rose), endophytes were screened and characterized. The diversity and community of endophytes within banana plants were analyzed by PCR-denaturing gradient gel electrophoresis (DGGE). The banana tissue culture plantlets were inoculated with the candidate endophyte, *Burkholderia cenocepacia* 869T2, and effects of *in planta* biocontrol were observed. Results: Endophytic *B. cenocepacia* 869T2 decreased the disease incidence of *Fusarium* wilt on treated banana plants to 3.4%, comparing to 24.5% of non-inoculated plants infected in the field test within a 7-month period. Furthermore, significant growth promoting of 869T2 inoculated banana plants was observed in field experiments. Conclusions: In addition to 869T2 genomic sequence data, our results suggest that the pyrrolnitrin and pyrroloquinoline quinone potential producer, *B. cenocepacia* 869T2, is a good biological control agent (BCA) for use in the biocontrol of *Fusarium* wilt and plant promotion.

Publisher : Springer

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[Nitrogen and phosphorus removal of locally...](#)

Indexing terms for this record :

Organism Descriptors : (13)

Descriptors : (16)

Identifiers : (14)

Broad Terms : (33)

GeographicLocation : (1)

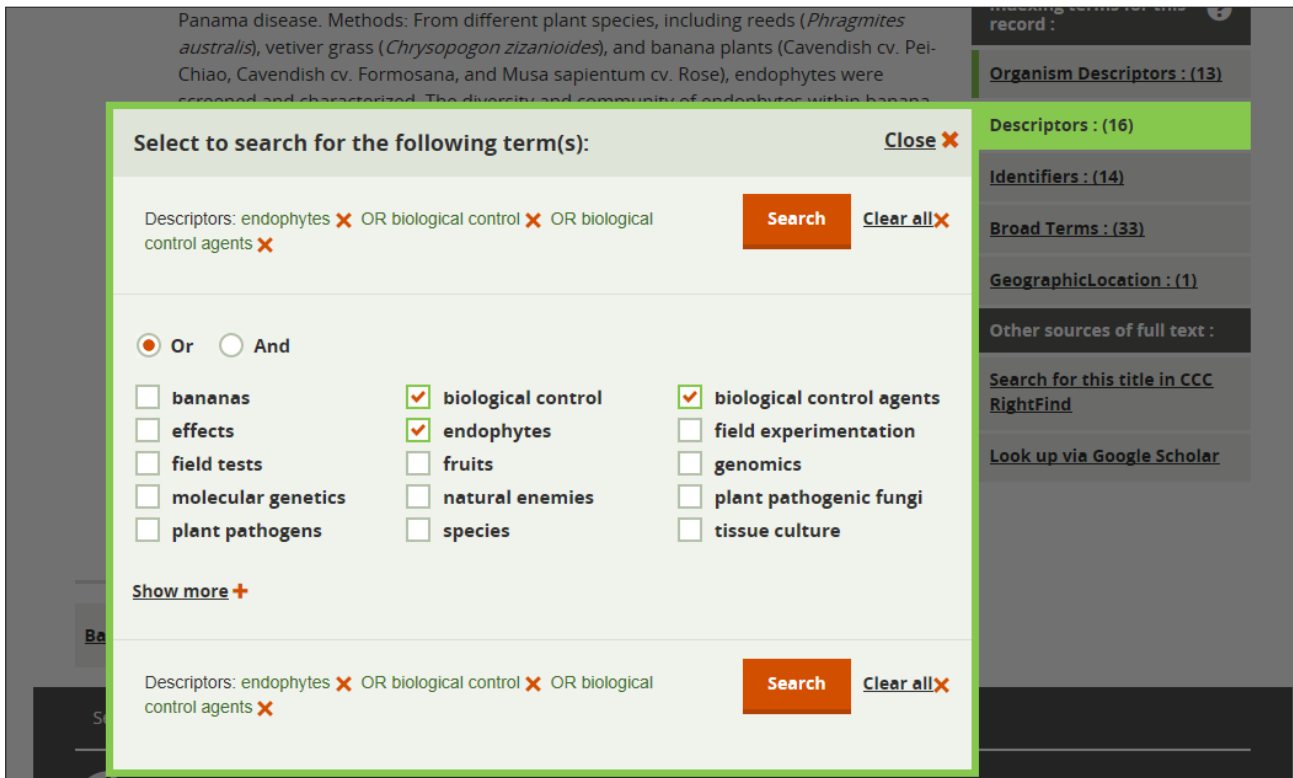
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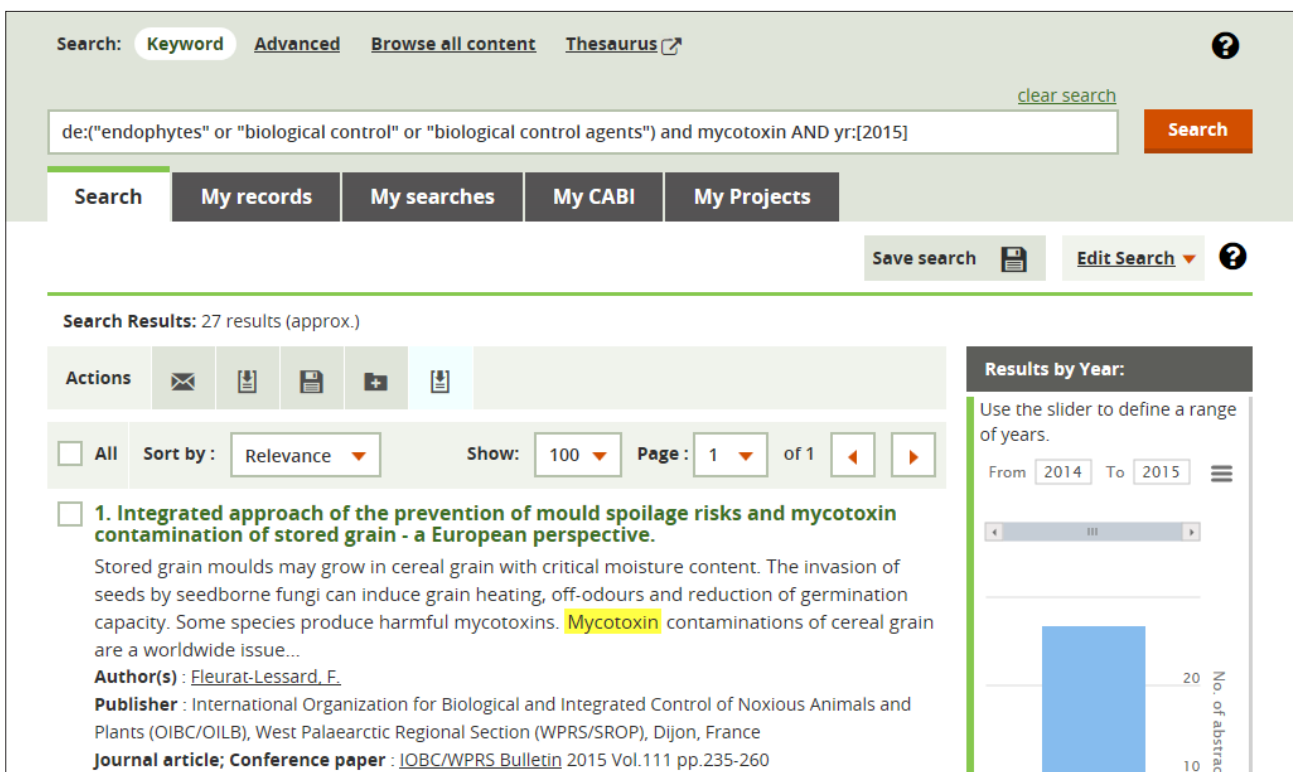
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By simply adding an additional keyword, CAB Abstracts can be used to look for other relevant research into endophytes that could provide additional insights, in this case, mycotoxins.



Search criteria: Descriptors: endophytes OR biological control OR biological control agents

Selected terms: biological control, biological control agents



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Search query: de:(\"endophytes\" or \"biological control\" or \"biological control agents\") and mycotoxin AND yr:[2015]


Search Results: 27 results (approx.)

Sort by: Relevance

Page: 1 of 1

Results by Year: Use the slider to define a range of years. From 2014 To 2015

1. **Integrated approach of the prevention of mould spoilage risks and mycotoxin contamination of stored grain - a European perspective.**
 Stored grain moulds may grow in cereal grain with critical moisture content. The invasion of seeds by seedborne fungi can induce grain heating, off-odours and reduction of germination capacity. Some species produce harmful mycotoxins. **Mycotoxin** contaminations of cereal grain are a worldwide issue...
 Author(s): Fleurat-Lessard, F.
 Publisher: International Organization for Biological and Integrated Control of Noxious Animals and Plants (IOBC/OILB), West Palaearctic Regional Section (WPRS/SROP), Dijon, France
 Journal article; Conference paper: IOBC/WPRS Bulletin 2015 Vol.111 pp.235-260

 We find evidence that mycotoxin accumulation can be inhibited when used against a different *Fusarium* species.

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Bacterial endophytes from wild maize suppress *Fusarium graminearum* in modern maize and inhibit mycotoxin accumulation.

Author(s) : [Mousa, W. K.](#); [Shearer, C. R.](#); [Limay-Rios, V.](#); [Zhou Ting](#); [Raizada, M. N.](#)
Author Affiliation : Department of Plant Agriculture, University of Guelph, Guelph, ON, Canada.
Author Email : raizada@uoguelph.ca
Journal article : [Frontiers in Plant Science](#) 2015 Vol.6 No.October pp.805 ref.many
ISSN : [1664-462X](#)
URL : <http://journal.frontiersin.org/articl...>
Record Number : 20153421453

Abstract :
Wild maize (teosinte) has been reported to be less susceptible to pests than their modern maize (corn) relatives. Endophytes, defined as microbes that inhabit plants without causing disease, are known for their ability to antagonize plant pests and pathogens. We hypothesized that the wild relatives of modern maize may host endophytes that combat pathogens. *Fusarium graminearum* is the fungus that causes Gibberella Ear Rot (GER) in modern maize and produces the mycotoxin, deoxynivalenol (DON). In this study, 215 bacterial endophytes, previously isolated from diverse maize genotypes including wild teosintes, traditional landraces and modern varieties, were tested for their ability to antagonize *F. graminearum* *in vitro*. Candidate endophytes were then tested for their ability to suppress GER in modern maize in independent greenhouse trials. **The results revealed that three candidate endophytes derived from wild teosintes were most potent in suppressing *F. graminearum* *in vitro* and GER in a modern maize hybrid. These wild teosinte endophytes could suppress a broad spectrum of fungal pathogens of modern crops *in vitro*. The teosinte endophytes also suppressed DON mycotoxin during storage to below acceptable safety threshold levels.** A fourth, less robust anti-fungal strain was isolated from a modern maize hybrid. Three of the anti-fungal endophytes were predicted to be *Paenibacillus polymyxa*, along with one strain of *Citrobacter*. Microscopy studies suggested a fungicidal mode of action by all four strains. Molecular and biochemical studies showed that the *P. polymyxa* strains produced the previously characterized anti-*Fusarium* compound, fusaricidin. Our results suggest that the wild relatives of modern crops may serve as a valuable reservoir for endophytes in the ongoing fight against serious threats to modern agriculture. We discuss the possible impact of crop evolution and domestication on endophytes in the context of plant defense.

Publisher : [Frontiers Editorial Office](#)

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Indexing terms for this record : 

Organism Descriptors : (8)

Descriptors : (14)

Identifiers : (10)

Broad Terms : (28)

Other sources of full text :

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However, the research shows that there may be potential risks, and CAB Abstracts covers research that examines the risks of introducing invasive endophytes too.

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What can possibly go wrong? The risks of introducing soil microorganisms from Antarctica into South America.

Author(s) : Nuñez, M. A.; Dimarco, R. D.; Dickie, I. A.; Pauchard, A.
Author Affiliation : Universidad Nacional del Comahue, INIBIOMA, CONICET, Grupo de Ecología de Invasiones, Quintral 1250, C.P. 8400, Bariloche, Argentina.
Author Email : nunezm@gmail.com
Journal article : [Bosque](#) 2015 Vol.36 No.3 pp.343-346 ref.31
ISSN : [0304-8799](#)
DOI : [10.4067/S0717-92002015000300001](#)
URL : <http://mingaonline.uach.cl/scielo.php...>
Record Number : 20163061918

Abstract :
 Endophytic fungi form mutualistic associations with plant roots which can increase plant survival and resistance to stress. Recently, it has been proposed that endophytic fungi from Antarctica should be used to facilitate reintroduction and establishment of native plants in xeric environments of northern Chile. In this note, we suggest this is a risky proposition and may lead to biological invasions. It is difficult to predict which endophytic fungi will become invasive, where they will invade, or what their impacts will be. Organisms that move across continents may or may not become invasive depending on the interaction between the species and the invaded community; unexpected outcomes may occur due to adaptation and novel interactions of the introduced species in the new environment. The fact that these endophytes are mutualistic does not imply that they will not have negative effects on the recipient community, since they might promote invasion of other non-native species or may change the competitive relationships among native species. Further, taxonomically uncharacterized fungal isolates from plant roots are likely to contain non-beneficial species. The fact that these endophytic fungi species are from Antarctica does not ensure that they cannot invade elsewhere. It should be recognized that invasive microorganisms are extremely difficult to control. We strongly suggest that the further translocation, use and spread of endophytes from Antarctica should be halted until a risk assessment is undertaken. Biosecurity measures must be taken when considering transcontinental experiments. Based on previous experiences, it is likely that the risk and potential costs of introducing these new species significantly exceed any potential benefits of their introductions.

Publisher : [Facultad de Ciencias Forestales y Recursos Naturales, Universidad Austral de Chile](#)

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Indexing terms for this record : ?

Descriptors : (12)

Identifiers : (13)

Broad Terms : (7)


GeographicLocation : (3)

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
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4/6/2016 6:43:59 PM	Added	Search: <i>invasive risk endophytic fungi</i> Show more	Number of Results: 2 Number of Saved Results: 0	 Add note
4/6/2016 6:42:43 PM	Added	What can possibly go wrong? The risks of introducing soil microorganisms from Antarctica into South America.	Number of Annotations: 2	 Add note
4/6/2016 6:37:58 PM	Added	Bacterial endophytes from wild maize suppress <i>Fusarium graminearum</i> in modern maize	Number of Annotations: 1	 Add note

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